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SAFEGUARDS MANAGEMENT INSPECTION
PROCEDURES

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August, 1984

Lawrence
Livermore
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Laboratory

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August, 1984

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FOREWORD

This task was accomplished at the request of the U.S. Nuclear Regulatory Commission, Office of Inspection and Enforcement by the Nuclear Systems Safety/Safeguards Program at Lawrence Livermore National Laboratory. This work was done under FIN A0253.

SAFEGUARDS MANAGEMENT INSPECTION PROCEDURES

1. OBJECTIVE

The objective of this inspection procedure is to assess the contributions of licensee management to overall safeguards system performance and effectiveness pursuant to 10 CFR Parts 70 and 73* and to generally accepted management practices.

*10 CFR is Code of Federal Regulations, Title 10 Energy, Parts 70 and 73.

2. INSPECTION REQUIREMENTS

When evaluating management effectiveness of a licensee's safeguards program, the inspector should be concerned not only with noncompliance to 10 CFR, Parts 70 and 73, but also with indications of poor management practices.

Whereas other NRC safeguards inspection procedures evaluate how well the licensee is adhering to the CFR for various safeguards functions, this inspection procedure also evaluates how effective the licensee's safeguards management is compared with generally accepted management practices. Inspection will be accomplished by evaluating the licensee's overall management structure as it relates to policy making, organization, information feedback, and safeguards task assignments. The inspector is expected to pursue site-specific issues and to investigate beyond the guidance contained in this procedure if evidence of management ineffectiveness is observed.

3. INSPECTION GUIDANCE AND METHODS

This section contains guidance and methods for the inspector to assess and verify that the licensee has established an effective management structure for administering the safeguards program as specified in the Fundamental Nuclear Material Control (FNMC) plan and in other applicable license conditions. Inspection will be accomplished by evaluating the licensee's safeguards management in four broad management functions: Policy, Organization, Feedback, and Task Assignments. Each of these management functions is briefly explained below in the context of safeguards management. Figure 1 provides a block diagram for the discussion that follows.

Policy. The function of Policy involves decision-making within the upper echelon of management for establishing goals, overall direction, operational plans, and standard operational procedures for the major safeguards groups at a facility.

Organization. The Organization function involves all personnel actions such as job descriptions, qualifications, and performance evaluations. It involves general administration as well as the activities within the task-oriented safeguards groups. Organization also includes training and the important aspect of separating safeguards responsibilities.

Feedback. The function of Feedback involves all processes that management uses to gather information and to judge individual task performance as well as overall performance. It includes task feedback, formal and informal communication channels (e.g., staff meetings, working group meetings, management memos, unsolicited suggestions, etc.), management information services, and internal and external audits.

Task Assignments. Task Assignments involve the management of each major safeguards organizational (task-oriented) group or system for carrying out

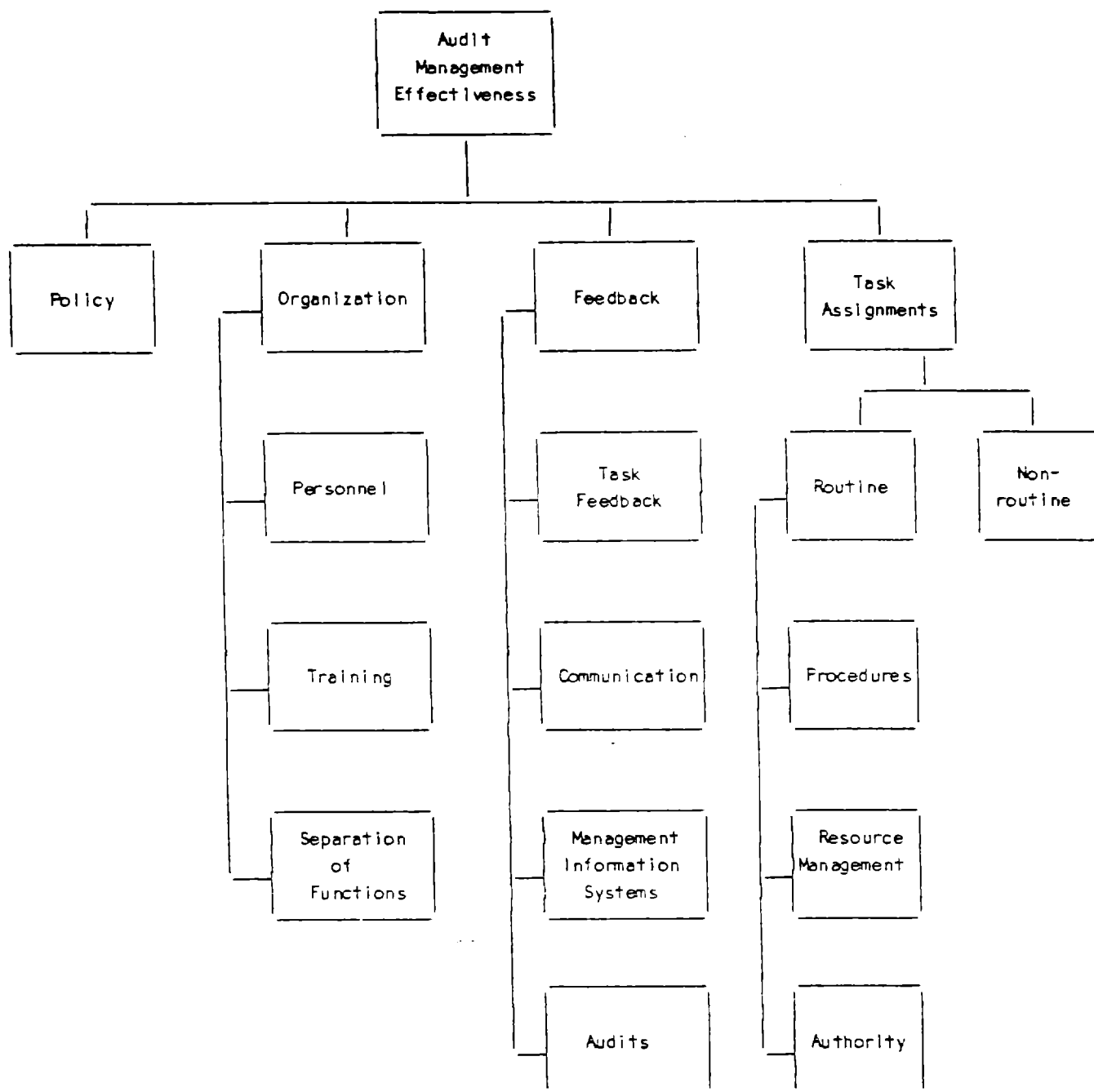


Figure 1. Block Diagram Model for Auditing Management Effectiveness

specific safeguards objectives. Assignments include both routine and nonroutine activities for accomplishing task objectives. Routine activities are normally scheduled task assignments. They consist of well-defined procedures, have personnel and other resources dedicated to performing the task, and have an established chain of authority. Nonroutine activities include those tasks which happen infrequently or which come about unexpectedly. Nonroutine tasks result because organizations operate in a dynamic environment and things don't always go according to plan. In this inspection module, the licensee's safeguards system is considered as seven separate task-oriented systems. These are:

- i) Material Accounting Records
- ii) Physical Inventory
- iii) Material Control
- iv) Measurement Control
- v) Statistical Evaluations
- vi) ID/LEID Investigation
- vii) Physical Protection.

The IE inspector will use the question sets of this module to assess the effectiveness of a licensee's management to overall safeguards performance. The question sets have been developed around the four management functions: Policy, Organization, Feedback, and Task Assignments, and follow the breakdown given in Fig. 1. The question sets are based upon 10 CFR, Parts 70 and 73, requirements and upon generally accepted management practices. Questions are intended to help the inspector evaluate management effectiveness for the licensee's overall safeguards system, including MC&A, Physical Protection, and areas of overlap. They point the inspector to primary areas of concern to the NRC, and they raise issues which are intended to expose management ineffectiveness.

The inspector can obtain insight into the issues raised by the question sets by (1) reviewing corporate policy, records, correspondence, management

memorandums, results of previous audits, and documentation on previous and existing problems, (2) observing the safeguards system in action, (3) interviewing safeguards management and staff personnel, and (4) testing. The inspector should then be able to draw conclusions as to management effectiveness in achieving safeguards goals.

Using questions as guidance, the inspector should document conclusions in narrative form for each function in Fig. 1, as well as for each subcategory. Conclusions about Policy, Organization, and Feedback should be stated for the entire safeguards systems. Conclusions for Task Assignments, however, should be given separately for each of the safeguards task-oriented groups noted in Section 3.4. Table 2 at the end of this module gives a recommended format for the written audit report on safeguards management effectiveness.

The inspector is reminded that the objective of this module is to determine management effectiveness of the licensee's safeguards system in contrast to determination of compliance to the CFR. The latter is intended to be handled with other NRC inspection modules. For convenience, however, the inspector may choose to combine an inspection for compliance with an audit of management effectiveness for one or more of the safeguards task-oriented systems. Table 1 relates the compliance inspection modules to the seven safeguards task-oriented systems previously identified.

Inspection for safeguards management effectiveness will be conducted in four parts corresponding to the four question sets. The question sets for Policy, Organization, and Feedback are given next in Sections 3.1-3.3, respectively, and require the inspector to look at the licensee's safeguards system as a whole and in a general way. The questions for Task Assignments are presented in Section 3.4 and differ from the other three sections in that they consist of both generic and specific questions for evaluating routine and nonroutine aspects of each of the seven safeguards systems.

COMPLIANCE INSPECTION MODULES

	<u>Records and Reports No. 85216B</u>	<u>Internal Control No. 85210B</u>	<u>Physical Inventory No. 85212B</u>	<u>Measurement Control No. 85206B</u>	<u>Shipper/ Receiver Verification No. 85208B</u>	<u>Inventory Verification No. 85213B</u>	<u>ID and Associated Limit-of-Error Investigation No. 85214B & 85215B</u>	<u>Loss Mechanism Analysis No. 85211B</u>	<u>Physical Protection Inspection Procedures</u>
Material Accounting Records	X	X	X						
Physical Inventory			X			X			
Material Control		X							
Measurement Control				X					
Statistical Evaluations	X		X		X		X	X	
ID/LEID Investigation									X
Physical Protection									

Table 1. Mapping of Compliance Inspection Modules to the Safeguards Task-Oriented Systems

3.1 Policy Question Set

Inspector Notes

1. Are standard operating procedures established for each safeguards system that are consistent with the approved licensee FNMC plan and licensee conditions?

- a. Are the procedures written and published?

 - b. Do they clearly identify goals and objectives?

 - c. Are they distributed to all personnel with assigned responsibilities?

2. Are the officially established procedures adhered to in practice for each safeguards system?

3. Are the procedures and degree of adherence to them reviewed during an internal audit of the safeguards system?

4. Are the standard operating procedures for each safeguards system reviewed periodically by management?

- a. Do facility personnel provide input to procedure changes?

Inspector Notes

5. Are the procedures and changes reviewed by top management (either the facility general manager or the individual charged with overall responsibility of the safeguards program)?

- a. Are procedures and changes authenticated by top management?

6. Do revisions in the procedures receive prior approval from the NRC where necessary?

7. Are manuals published and distributed detailing standard operating procedures?

- a. Are the manuals kept up to date?

- b. Are examples of required forms, etc., provided?

8. Do the procedures incorporate time schedules and standards for reports and work products?

- a. Are the schedules and standards for each safeguards system coordinated with and compatible to other systems?

Inspector Notes

9. Do the procedures provide for an authentication process of different reports and work products?
- a. Is the signature granting authority sufficiently high in the organizational hierarchy such that credibility is given to the reports and work products?
- b. In case of absences, is auxiliary signature granting authority specified?
10. Do the procedures incorporate checks and balances?
- a. Separation of functional responsibilities?
- b. Two-man rule?
- c. Creation of an audit trail?
11. Does corporate policy encourage individuals to question perceived noncompliance of safeguards policy?
12. Is there an adequate balance in management priorities across safeguards areas?

Inspector Notes

13. What does management do to establish and maintain an appropriate level of safe-guards awareness?

3.2 Organization Question Set

Inspector Notes

A. Personnel

1. Are job descriptions provided and job qualifications specified for facility personnel? _____
 - a. Written, published, disseminated? _____
 - b. Reviewed and updated periodically? _____
 - c. Specify areas of responsibility and levels of authority? _____
2. Are job qualification standards specified and published? _____
 - a. For entry-level personnel? _____
 - b. For nonentry-level personnel? _____
3. Are employee appraisal evaluations:
 - a. Conducted at least annually? _____
 - b. Based upon written job descriptions? _____
4. Does the supervisor listed in the job description make the evaluation? _____

Inspector Notes

5. Are provisions made to evaluate more frequently employees new to a position?

6. Do employees comment on their evaluations?

7. Are the evaluations used in determining wage increases?

8. Are the evaluations used in determining promotions?

9. Do employee appraisal evaluations provide a forum for management/staff dialogue?

B. Training

1. Are opportunities for training provided to staff?

2. What does training cover?

a. Safeguards?

3. How is training initiated?

4. How much emphasis does management place upon training?

Inspector Notes

5. To what extent are the training goals achieved by management?

6. Are there any formal means for revising training activities based upon feedback?

7. Are current records kept of all employee training?

8. Are the goals of the safeguards program, and the employee's specific part in the program, made known to the employee and continually reinforced?

C. Separation of Functions

1. Is there an appropriate separation of functions/duties between safeguards organizational groups, and between safeguards and other facility systems?

a. Material Accounting Records?

b. Physical Inventory?

c. Material Control?

d. Measurement Control?

Inspector Notes

- e. Statistical Evaluations? _____
- f. ID/LEID Investigation? _____
- g. Physical Protection? _____
- h. Facility Operations? _____
- 2. Except at top level management, is the authority to make decisions separated so that one individual does not have excessive authority? _____
- 3. Is the safeguards information flow restricted to individuals on a need-to-know basis? _____

3.3 Feedback Question Set

Inspector Notes

A. Task Feedback

1. Do employees have a means for reporting any work-related problem to management?

a. Formal means?

b. Informal means?

c. Discreetly and/or in confidence?

d. On a timely basis?

e. Choice of immediate and/or higher level supervisor?

f. Documentation of problem and solution distributed to both management and staff?

2. Are employees encouraged to identify and make suggestions on:

a. Management problems?

b. Technical (task) problems?

c. Personnel problems?

Inspector Notes

3. Are employees solicited by management for input to:

a. What management is doing that may be detrimental?

b. What management could be doing to be helpful?

c. What management is doing that is constructive?

d. Solutions to management, technical, personnel problems?

4. Does management respond to employee feedback?

a. In a timely fashion?

b. In a sincere manner that is constructive?

c. That demonstrates good will?

d. With recognition? awards?

5. Does the supervision of all employees include daily personal observation?

Inspector Notes

- a. Does the supervisor performing daily supervision also make out the appraisal evaluation on the employee?

6. Are reports of task accomplishment always reported to the next echelon authority as well as to the person making the assignment?

B. Communication

1. Are there formal procedures (such as staff meetings/working group meetings) established whereby information is passed from top management to all employees?

- a. Is the information communicated in a timely manner (i.e., does the information flow take more than one day)?

- b. Does the channel work both ways (i.e., do employees have their questions promptly answered)?

2. Is there an employee suggestion program established?

Inspector Notes

a. Does the employee receive awards
for accepted suggestions?

b. Is the program publicized such
that all employees are aware of
specific details of the program?

3. Is there a process whereby the
employee can take concerns beyond
his immediate supervisor?

C. Management Information System

1. Is there an established Management
Information System (MIS) whereby
statistics are reported periodically?

a. What is the period?

b. Is the MIS accurate and timely?

c. Is statistical information
routinely reported on a timely
basis to appropriate levels of
management?

d. Are employee absentee rates
monitored by appropriate levels
of management?

Inspector Notes

- e. Are employee turnover rates monitored? _____
2. Is there an established procedure whereby the summary results of all assignments are reported to the next echelon authority periodically? _____
- a. What is the period? _____
- b. Are reports written? _____
- c. Are problem areas clearly described? _____
3. Are all NRC required records maintained for the specific period of time? _____
4. Are all MIS records secured so that only authorized personnel with a need for that information are allowed access? _____
- a. Is a log kept of all personnel who examine the records as well as what records were examined? _____
- b. Is the log secured? _____

D. Internal and External Audits

1. Does management have an established set of plans for conducting the annual audits and reviews?

a. Are they structured to assess the adequacy of safeguards procedures and practices?

b. Are they structured to verify conformance to safeguards objectives and license conditions?

c. Are the plans followed in practice?

d. Are the plans reviewed for adequacy on a periodic basis? Period?

e. Are priorities within the plans revised upon the conclusion of an audit and review?

f. Do the plans reflect management initiative and concern?

2. Are the annual audits and reviews by management

a. Allocated adequate resources and support?

Inspector Notes

- b. Given a high priority? _____
- c. Accomplished in an orderly and
timely fashion? _____
- 3. Are the management audits and
reviews conducted by individuals
 - a. Whose organizational positions
permit independence of action
and objectivity? _____
 - b. Who have authority to obtain
all necessary information? _____
 - c. Who are knowledgeable and trained
in accepted auditing procedures? _____
 - d. Who report directly to the Safe-
guards Manager? _____
 - e. Who have other significant
organizational responsibilities
which could interfere or create
conflicts in priorities? _____
- 4. Do the annual audits and reviews by
management
 - a. Include all aspects of the safe-
guards system? _____

Inspector Notes

- b. Provide quality results? _____
- c. Highlight discrepancies? _____
- d. Show trends in recurring problem areas? _____
- e. Cover areas where significant discrepancies have previously occurred? _____
- 5. Are results of internal audits and reviews automatically reported to top corporate and plant management? _____
 - a. Are the results adequately documented with discrepancies highlighted? _____
 - b. Has management responded constructively to past audit reports? Examples? _____
 - c. Are solutions to discrepancies implemented in a timely fashion? _____
 - d. Have solutions to past discrepancies been effective? _____

Inspector Notes

- e. Does management follow up to ensure that problem areas are resolved?
- f. Are there examples of where management demonstrated indifference or unwillingness to act on discrepancies?
- 6. Are written responses communicated to auditors?
 - a. Management's perspective of problem areas?
 - b. Proposed solutions to reported discrepancies?
 - c. Dates at which solutions have been implemented?
- 7. How has management responded to NRC inspections and assessments?
 - a. Is high priority given to resolving issues?
 - b. Is there an attitude of cooperation?

Inspector Notes

- c. Are solutions to problem areas normally effective and of a permanent nature? _____
- d. Are there differences in the ways internal and NRC-raised issues are handled? _____
- e. Does management show signs of implementing only minimum solutions? _____
- f. Does management followup to ensure problem areas are resolved? _____
- g. Are internal auditors made aware of NRC inspection results? _____
- h. Has management been successful in discounting NRC-raised issues? _____
- i. Are communications thorough? _____
- j. Are there examples where management demonstrated indifference or unwillingness to act? Examples of things gone undone? _____
- k. Is one individual responsible for coordinating a response to NRC-raised issues? _____

3.4 Task Assignments

As discussed in Section 3, this inspection module considers a safeguards system to be composed of seven organizational systems for accomplishing the safeguards objectives specified in the CFR. These seven systems are:

- i) Material Accounting Records
- ii) Physical Inventory
- iii) Material Control
- iv) Measurement Control
- v) Statistical Evaluations
- vi) IN/LEID Investigation
- vii) Physical Protection.

Providing individual question sets for evaluating management effectiveness for each of the seven systems would result in considerable duplication. Instead, the generic question set for task assignments in Section 3.4.1 is to be applied individually to each of the seven systems. Questions follow the outline of Fig. 1 for routine task assignments: procedures, resource management and authority.

Recognizing, however, that each of the systems is diverse, additional guidance is given in Sections 3.4.2 - 3.4.8 to supplement the generic question list as well as to address nonroutine aspects of each system. When auditing for management effectiveness of a safeguards system, the inspector should (1) interpret the generic questions of Section 3.4.1 in the framework of the particular system being analyzed and (2) apply and expand upon the key issues noted in Sections 3.4.2 - 3.4.8.

3.4.1 Task Assignments Generic Question Set

Inspector Notes

A. Procedures

1. Are the procedures actually practiced within the safeguards system consistent with written procedures?

2. Are the current procedures and revisions coordinated with/communicated to (if applicable):

a. Material Accounting Records?

b. Physical Inventory?

c. Material Control?

d. Measurement Control?

e. Statistical Evaluations?

f. ID/LEID Investigation?

g. Physical Protection?

h. Facility Operations?

3. Are all task members adequately informed of current procedures?

Inspector Notes

4. Do current safeguards procedures promote efficient performance and coordination of work duties?

5. Are inputs and outputs communicated in a precise and timely fashion (if applicable) with:

a. Material Accounting Records?

b. Physical Inventory?

c. Material Control?

d. Measurement Control?

e. Statistical Evaluations?

f. ID/LEID Investigation?

g. Physical Protection?

h. Facility Operations?

6. Are there routine safeguards activities which are not covered by written procedures?

7. Are there written procedures for handling contingencies and/or emergencies?

Inspector Notes

8. Are safeguards goals continuously stressed?

9. Is the level of safeguards awareness reasonably high?

B. Resource Management

1. Are the tasks associated with each safeguards system adequately portioned into individual duty assignments?

2. Are individual duty assignments clearly defined and communicated:

a. To individuals involved?

b. To entire staff (where necessary)?

c. In writing?

3. Are there enough personnel with technical skills to perform routine assignments on schedule?

4. Are task members

a. Adequately trained to accomplish objectives?

Inspector Notes

- b. Sufficiently cross-trained to allow for contingencies and rotation of duties? _____
- c. Rotated of duty assignments periodically? Period? _____
- 5. Are there individuals with conflicting or incompatible task assignments? _____
 - a. Have internal controls been compromised? _____
- 6. Is segregation of functional responsibilities maintained
 - a. Within a safeguards system? _____
 - b. Across safeguards systems? _____
- 7. Are basic supplies/services available? _____
 - a. Clerical/secretarial assistance? _____
 - b. Copying equipment and services? _____
 - c. Computational aids? _____

Inspector Notes

8. Are proper equipment and/or facilities available?

a. Are maintenance schedules published and followed?

b. Are there provisions for preventive maintenance?

9. Has an allowance been made for absenteeism?

a. Are reserve staff available?

b. Is the absenteeism rate abnormally high?

C. Authority

1. Are individuals provided sufficient authority to ensure task accomplishment?

2. Does the group have sufficient authority to obtain all necessary information required to perform the task?

3. Are all members of the group knowledgeable of the authority structure

Inspector Notes

- a. From the general manager to their group? _____
- b. Within their group? _____
- 4. Are those members of the group who perform duties requiring inputs or outputs with other safeguards groups knowledgeable of the authority structure in the other groups? _____
- 5. Are there individuals with seemingly too much implicit or explicit authority with respect to
 - a. Separation of functions? _____
 - b. Access to SNM? _____
 - c. Access to records? _____

3.4.2 Material Accounting Records

The material accounting records system is that part of a licensee's safeguards system that originates and maintains documentation on the quantity, composition, and location of SNM at a facility. The purpose of the material accounting records and reports is to provide enough information to characterize in detail the SNM at a facility so that material balances can be computed for each material balance area and accounts can be reconciled with each other and with physical inventory. Further, an effective system will provide an accurate and complete audit trail for tracing the history of SNM over an extended period of time and for accounting for its physical movements

and transfers, its chemical changes, losses, and disposal. The objective is to have accurate SNM accounting data that is timely and that can be relied upon for assuring that the licensee is in control of his SNM.

An accounting structure typically has three principal components: source documents, a transaction journal and a general ledger.

- o Source documents are original records of measurements or observations. Source documents provide the link between the accounting information in the general ledger and the basic measurement data.
- o Transaction journal is a chronological listing or history of material transactions with summary data. The transaction journal exists to supply traceability between the occurrence of transactions and their recording in the general ledger.
- o A general ledger is a book or computer database in which material transactions are posted into accounts and subsidiary accounts as either debits or credits, as in double-entry bookkeeping. The general ledger provides information about the total quantity of material held and the distribution or disposition of that material.

The inspector should be concerned with the quality of a licensee's material accounting records and reports:

- o Accounting structure (format) for organizing and maintaining recorded data and supporting documents
- o Implementation procedures for assuring data integrity
- o Interactions by the accounting system with other safeguards components or systems

The inspector will consider key issues when evaluating management effectiveness of an accounting system.

Key Issues Associated with Material Accounting Records

1. How effective is the accounting structure in keeping track of all SNM composition:
 - a. In process?
 - b. In storage?
 - c. Discarded?
 - d. Shipped?
 - e. In MBAs?
 - f. In ICAs?
 - g. By element type and fissile isotope?
2. How accurate are the numbers entered into the accounting records?
 - a. How are adjustments due to measurement corrections and errors made?
 - b. Have there been an unusual number of adjustments to the accounting records?
3. What type of self-checking features, checks and balances, or internal controls exist and how effective are they?
 - a. In checking for completeness and accuracy?
 - b. In detecting for transcription and calculational errors?
 - c. In protecting against data falsification?
 - d. In disallowing access by one individual to the complete accounting records?

4. How effective are the authorization procedures for limiting access to the accounting records?
5. How vulnerable are the accounting records to data falsification?
6. How complete an audit trail do the accounting records represent?
 - a. Are the records traceable to original data?
 - b. Can audits be readily accomplished?
7. Does the accounting system provide data on a timely basis?
8. How effective is management in separating access to SNM and to the accounting records?
9. What kind of accounting problems have been encountered in the past?
 - a. How effective has management been in resolving these problems?
 - b. Are there indications or trends that point to ineffective management?
 - c. What events have happened that suggest the absence of quality management? Examples?
10. How well does management plan?
 - a. Are problems anticipated and contingencies developed?
 - b. Are there indications of operating in a reactionary mode?

3.4.3 Physical Inventory

CFR 70.51(A)(8),(e)(3) and (f) address the requirements for periodic physical inventories of SNM based upon measured values. A primary objective of physical inventory is to provide assurance that SNM is present in a plant

where it is supposed to be (i.e., in assigned locations) and in correct amounts by element and isotope, and that no significant amount of SNM cannot be accounted for. This objective is accomplished by reconciling the facility book inventory records with the results of the physical inventory and by calculating appropriate performance measures (cf. Section 3.4.6) for the inventory period.

Management practices can influence inventory results significantly, and therefore influence the degree of assurance provided by physical inventory. Listed below are critical issues which an inspector should keep in mind when evaluating management effectiveness for the task of physical inventory.

Key Issues Associated With Physical Inventory

1. Evaluate the quality of inventory planning:
 - a. What kind of planning takes place?
 - b. How soon does the planning take place for the next inventory relative to the completion time of the last inventory?
 - c. Are plans updated or revised based upon events of previous inventories?
 - d. Are problems anticipated and contingencies developed?
2. Evaluate the quality of the inventory:
 - a. Did they follow their plan?
 - b. Did the inventory run smoothly?
 - c. Did anything unexpected, unusual or unanticipated happen?
 - d. How did management deal with problem areas?
 - e. Did management accomplish their safeguards objectives?
3. What kind of physical inventory problems have been encountered in the past?

- a. Has management been effective in resolving these problems?
 - b. Are there indications or trends that point to ineffective management?
 - c. What events have happened that suggest the absence of quality management?
4. Evaluate the quality of the licensee procedures for:
- a. Implementing the two-man rule during actual inventory,
 - b. Ascertaining the integrity of sealed sources,
 - c. Cutting-off transfers and processing,
 - d. Procedures on process shutdown/cleanout,
 - e. Procedures on placement of in-process material into uniquely identified containers,
 - f. Making mass measurements,
 - g. Making isotopic measurements on small and bulk samples,
 - h. Remeasurements,
 - i. Restarting the process,
 - j. Recording inventory data.
5. Did assignments occur on the previous physical inventory which were not covered by written procedures?
- a. Examples?
 - b. Do nonroutine assignments happen with sufficient frequency to warrant being included in the written procedures?
 - c. Do the nonroutine assignments have an adverse impact upon physical inventory?
6. Evaluate how well the plant reconciled their physical inventory to the book inventory for both total plant and material balance areas.

- a. Are questionable trends apparent?
7. Evaluate the quality of physical inventory records.
- a. Do the records provide an audit trail?
 - b. Do the records support activities before, during and after a physical inventory?
 - c. Are the records protected and access-limited?
 - d. Is there separation of responsibility between physical inventory records and book inventory records?
8. With respect to inventory teams:
- a. How are they selected?
 - b. How well are they trained?
 - c. What potential conflicts of interest exist?
 - d. How are conflicts of interest handled?
 - e. What checks and balances exist?
 - f. Are separation of responsibilities honored?
9. With respect to the person in charge:
- a. What qualifications?
 - b. How selected?
 - c. How knowledgeable?
 - d. Degree of awareness of safeguards objectives?
 - e. How well does this individual interact with the inventory team, safeguards staff, and operations personnel?
10. Evaluate the interactions between the physical inventory team and
- a. Material Accounting Records
 - b. Measurement Control

- c. Statistical Evaluations
- d. ID/LEID Investigations.

3.4.4 Material Control

A properly designed and implemented material control system plays an important safeguards role by monitoring and controlling the handling, movement, and storage of SNM at a facility. Material control can be accomplished in several ways, but it generally includes procedures for restricting access to SNM, procedures for unique identification of SNM quantities, procedures for transferring responsibility of SNM from one safeguards group to another, incorporation of checks and balances or verification procedures at facility interfaces, and documentation on SNM movement to provide an audit trail. The intent is to prevent any opportunity for material loss or diversion and to apply checks and balances which provide assurance that SNM is under control. The control and monitoring of SNM can be a formidable task and should be highly structured and formalized.

The CFR requirements pertaining to material control are given in paragraphs 70.51(e)(1) and 70.58(h). This inspection, however, should focus on management effectiveness in achieving the goal of controlling the handling and flow of SNM at a facility. How effective management is in planning and implementing material control will impact upon the ability of the safeguards system to provide timely knowledge of the identity, quantity, and location of all SNM contained with the facility. Several key issues to be considered when evaluating management effectiveness are presented below.

Key Issues Associated With Material Control

1. How well does management plan?
 - a. Are problems anticipated and contingencies developed?
 - b. Does management operate in a reactionary mode?

2. How effective are licensee procedures for identifying and locating items and containers?
3. How effective are the procedures for tamper-safing containers and vaults?
 - a. What problems occur?
 - b. How does management respond to single and to recurring problems?
4. How effective are licensee procedures for control of:
 - a. Unused tamper-safing devices?
 - b. Tamper-safing device records?
 - c. Blank material-transfer forms?
 - d. Material-transfer records?
5. How effective are licensee procedures for conducting SNM transfers, both internal and external, with respect to:
 - a. Measurements?
 - b. Tamper-safing and identification?
 - c. Completion of a material transfer form?
 - d. Authorizing signatures?
 - e. Documentation of transfer?
 - f. Verification from receiver?
 - g. Timeliness of transfers and supporting paper work?
6. How effective are licensee procedures for restricting access to SNM and to SNM records?
 - a. When SNM is not in processing equipment, is it under lock and key? Tamper-safed?
 - b. Are there individuals with unnecessary access?

- c. Can an individual have access to SNM without being monitored or without having a check on his activities?
 - d. Are SNM records protected?
7. Are checks and balances taken lightly?
- a. Lack of measurement verification by receiver of SNM?
 - b. Lax two-man rule?
 - c. Unusual trust between individuals who should be providing checks?
8. Has management done anything innovative to enhance the material control system or to check on its capability, or do they wait until something appears out-of-control before they act?
9. What kind of material control problems have been encountered?
- a. How effective has management been in resolving these problems?
 - b. Examples?
10. What kind of track record does the licensee have in material control?
- a. Are there indications and trends that point to ineffective management?
 - b. What events have happened that suggest the absence of quality management?

3.4.5 Measurement Control

Measurement control is the overall process of determining the limitations and capabilities of a measurement system, traceable to a set of reference standards, and then developing control mechanisms to keep within selected operating constraints. Measurement control establishes confidence in management decisions pertaining to the safeguarding and accountability of SNM.

Measurement systems are not perfect, due to fundamental physical limitations (bias, drift, random fluctuations, sampling errors, dynamic range, environmental constraints, etc.). Mechanisms must be employed to quantify and characterize overall performance and to signal when operating constraints are exceeded. Measurement control concepts for MC&A from NRC's point of view are contained in 10 CFR 70.57. These concepts generally involve the following actions:

- (1) Maintaining working and reference measurement standards;
- (2) Understanding and characterizing the measurement system limitations a priori to implementation;
- (3) Collecting and analyzing statistically relevant performance data under controlled conditions to arrive at underlying statistical uncertainties and necessary measurement corrections;
- (4) Implementing statistical control mechanisms for detecting when a measurement system exceeds acceptable operating limits for monitoring measurement quality;
- (5) Audits and reviews and the preservation of test information and performance data.

SNM measurement control is sophisticated and complex. Consequently, management should be vigilant in assuring themselves and the NRC inspectors that their measurement systems are operating as intended.

Inspectors should use the generic question set of Section 3.4.1 to help evaluate management effectiveness for measurement control systems. Other key issues in measurement control are given below and should also be included in the inspector's evaluation.

Key Issues in Measurement Control

1. How effective is the licensee in maintaining reference and working standards?
2. To what extent has the licensee characterized the material measurement system?
 - a. What is the quality of their supporting analyses for the sampling and mixing procedures being employed? Do they characterize the limitations and constraints, etc?
 - b. What is the quality of their supporting engineering analyses for characterizing and understanding limitations to the total measurement system?
 - c. How frequently are the measurement system analyses repeated and updated? Do they correspond to when changes are made in the measurement system?
3. Evaluate the quality of the licensee's measurement performance data.
 - a. Are the measurement performance data current?
 - b. How often are measurement performance data obtained?
 - c. Are the performance data traceable to a working standard and a reference standard?
 - d. Does the licensee recalibrate when a change is made in the measurement system?
 - e. What kind of problems arise that indicate a need for measurement system recalibration?
 - f. Is the measurement system always in need of recalibration?
4. Are measurement performance data taken under controlled conditions?
 - a. How effective are the blending and sampling procedures?

- b. What is the quality of the procedures for collecting replicate control measurement data?
 - c. Are both good and bad data reported from the replicate control measurements?
 - d. Are conditions under which the control data were taken carefully noted and reported?
 - e. Do the measurement performance data frequently indicate a need for system recalibration?
5. Evaluate the quality of the licensee's statistical analyses on internal and contractor performance data for quantifying
- a. Sampling errors
 - b. Bias corrections
 - c. Variances of biases
 - d. Random error variances
 - e. Limits for systematic error.
6. Identify and evaluate the effectiveness of the licensee's statistical control mechanisms, including the use of control charts, for monitoring the quality of each measurement system.
- a. Does the information indicate that the licensee has had problems in keeping his measurement systems within control?
 - b. Do some measurement control problems tend to recur at a higher frequency than should be expected?
 - c. How effective are the corrective actions taken by the licensee when a system is found to have deficiencies? Are they timely?
 - d. Does management plan for contingencies?
7. Evaluate the quality of the licensee's audits and reviews of facility and contractor measurement control system.

- a. What kind of problems have been reported and how has management responded?
 - b. Are the reviews and audits structured to provide assurance to the facility management and to the NRC?
- 8. Have past audits and reviews resulted in changes to the measurement control program?
 - a. What changes have been implemented?
 - b. Are changes to the program followed closely?
- 9. Are adequate records kept by the licensee's measurement control program on both current and historical data and procedures employed?
- 10. How well does management plan? Do they anticipate problem areas and develop contingencies?
- 11. What kind of measurement control problems have been encountered?
 - a. How effective has management been in resolving these problems?
 - b. Examples?
- 12. What kind of track record does the licensee have in measurement control?
 - a. Are there indications and trends that point to ineffective management?
 - b. What events have happened that suggest the absence of quality management?

3.4.6 Statistical Evaluations

The purpose of a safeguards statistical evaluation program is to arrive at meaningful performance measures which indicate how well a facility is accounting for SNM. Performance measures specified in the CFR include a determination of: (1) the material unaccounted for (MUF), also referred to as Inventory Difference (ID), (2) the limit of error of MUF (LEMUF), also called LEID, (3) shipper-receiver (S/R) differences, and (4) limit of error on S/R (LES/R) data, where the limit-of-error parameters are directly related to the statistical variances of the first two measures.

The accounting for SNM at a facility can never be perfect because of inherent uncertainties in measurements and in subsequent data analyses. Imprecision in accounting for SNM results from uncertainties in measurement systems, in the mathematical models used for data analyses, and in the recording of data (e.g., bookkeeping and transition errors).

Measurement uncertainty results from several factors, including bias, drift, random noise, and sampling errors due to human error or to material inhomogeneity, all of which may be nonstationary in some context. The mathematical models used to quantify the SNM amount from the measurements also have limitations because they are mathematical representations of the true phenomenology. These models may be valid for only certain process conditions, and must necessarily contain approximations. Consequently, there will always be an inventory difference between the results of a physical inventory, which is based upon measurements taken at one point in time, and the book inventory, which is obtained from measurements taken over a material balance period. An understanding of the uncertainties associated with the ID and LEID computations is fundamental in determining whether a safeguards system is in control. Similar comments can be made regarding the computation of shipper/receiver (S/R) differences between two facilities.

Ideally a safeguards system would be able to detect and resolve with high probability trickle and block losses of SNM, whether due to process peculiarities, to theft diversions, or to hoax scenarios. Many factors prevent perfect detection and resolution, one of which is measurement system noise (uncertainty) as discussed above and previously in Section 3.4.5. Other factors include SNM loss detectors (ID/LEID) models which may not be equally sensitive to all types of loss mechanisms because of inadequate mathematical structures, misapplication of the models, or lack of updating model parameters.

The qualities of the licensee's ID and S/R limit-to-error models are critical to being able to ascertain how well the safeguards system is functioning and what aspects of the system are the major contributors to uncertainty. The latter is especially important in localizing problem areas within the measurement system and in investigating significant IDs and LEIDs. These factors, coupled with the fact that losses through discards and holdup in pipes and process vessels appear similar to theft or diversion, make the safeguards detection and resolution problem difficult.

Even though ID and LEID are performance measures specified in the CFR for detecting when things are out of control, a safeguards system cannot rely strictly on these two parameters. An effective management system will take a holistic approach to increasing the awareness of ID and LEID causes and to planning for contingencies so that when excessive values or questionable trends for ID and LEID surface, the system will be ready to respond meaningfully.

Listed below are key issues which the inspector should consider when evaluating management effectiveness of a licensee's statistical evaluation program.

Key Issues in Statistical Evaluations

1. Evaluate the quality of the licensee's program for calculating ID, LEID, S/R differences, and LES/R.
 - a. Are qualified statisticians employed who are knowledgeable about measurement systems and the modeling of uncertainties?
 - b. How current are the measurement performance data used to compute LEID and LES/R?
 - c. What procedures are followed to ensure that the LEID and LES/R models are current and correspond with the actual measurement systems being employed?
 - d. Is there evidence to suggest that the measurement performance data obtained from the measurement control program is inadequate?
 - e. Are additional performance data requested of the measurement control program? How often?
 - f. What checks and balances does management employ for assuring accurate computation of performance measures?
 - g. Do results of calculations undergo an independent review?
 - h. What is management doing to refine their understanding of contributions to IDs, LEIDs, S/R differences and LES/Rs?
2. What additional analyses does the licensee accomplish as a check on system performance?
 - a. Are trend analyses over time conducted for IDs, LEIDs, S/R differences, and LES/Rs?
 - b. Are trend analyses conducted for the measurement systems that contribute the most to overall uncertainty?
 - c. Are performance measures correlated with process conditions and with the measurement systems used for those particular process conditions?

- d. What is management doing to indicate that identifying and quantifying measurement and process uncertainties is a high priority?
 - e. Are trend analyses conducted for process uncertainties such as process holdup and waste?
3. What procedures are followed when excessive IDs, LEIDs, S/R differences and LES/Rs surface?
- a. Does management plan for handling situations when the safeguards system is out of control?
 - b. What methods are used for identifying the primary contributors to the safeguards system being out of control?
4. How effective are the interactions between personnel responsible for statistical evaluations and for measurement control?
- a. How well does the measurement control program respond to questions, inquiries, and concerns from statistical evaluations? Are responses timely?
 - b. What problems have arisen that suggest that management is ineffective in coupling the efforts of measurement control and statistical evaluations? How has management responded?
5. How well does management plan?
- a. Are problems anticipated and contingencies developed?
 - b. Does management operate in a reactionary mode?
6. What kind of ID, LEID, S/R, and LES/R problems have been encountered?
- a. How effective has management been in resolving these problems?
 - b. Examples?

7. What kind of track record does the licensee have in deriving meaningful statistical performance measures?
 - a. Are there indications and trends that point to ineffective management?
 - b. What events have happened that suggest the absence of quality management?

3.4.7 ID/LEID Investigation

ID/LEID investigations in the context used here are concerned with investigating for both potential and actual causes for excessive IDs and LEIDs. In many cases potential problem areas, indicating a system out of control, can be identified a priori to the occurrence of a safeguards event. An effective safeguards management will be concerned with understanding all potential loss mechanisms and measurement problems for the various processes and will institute methods for monitoring, controlling, or resolving these weak points. The issue from an inspector's point of view is to determine to what extent management is able to identify potential problem areas, what they are doing to prevent unacceptable situations from developing, and how effective they are in resolving anomalies once they occur.

Listed below are key issues which the inspector should consider when evaluating management effectiveness of the ID/LEID investigation aspect of a licensee's safeguards system.

Key Issues in ID/LEID Investigations

1. Does the facility have a history of ID/LEID problems?
 - a. Are there indications and trends that point to ineffective management?

- b. What events have happened that suggest the absence of quality management?
2. Have there been past investigations for ID/LEID causes?
- a. What kinds of problems were identified by the licensee? By the NRC?
 - b. How extensive and serious were the problems?
 - c. How effective was management in curing the problems?
 - d. Are problems continuing to occur?
3. Has management systematically studied their process and measurement systems and identified potential and actual problem areas?
- a. What are they doing to alleviate the suspect problem areas?
 - b. Are quality assurance measures being employed?
 - c. Are they employing special monitoring techniques and data analyses to predict when a problem is developing?
 - d. How comprehensive are their analyses? Is it an ongoing activity or infrequent?
 - e. Are they able to correlate accountability problems with certain process measurement procedures?
 - f. Have they prioritized the potential problem areas and developed contingency plans accordingly?

3.4.8 Physical Protection

The monitoring and controlling of the movement of personnel and of SNM into, within, and out of a facility are necessary to provide protection against theft, diversion, and hoaxes involving SNM. Control is generally the responsibility of physical security safeguards. In particular, 10 CFR 73.45 (b)-(f) requires that a licensee's physical protection (PP) system include the following performance capabilities:

- o Prevent unauthorized access of persons, vehicles, and materials into material access areas (MAAs) and vital areas (VAs),
- o Permit only authorized activities and conditions within protected areas (PAs), MAAs, and VAs,
- o Permit only authorized placement and movement of SNM within MAAs,
- o Permit removal only of authorized and confirmed forms and amounts of SNM from MAAs,
- o Provide for authorized access and assure detection of, and response to, unauthorized penetrations of the PA.

These performance objectives are accomplished through the use of (1) physical controls (e.g., physical barriers to isolate VAs, MAAs, and PAs); (2) access controls (e.g., picture identification badges and guard portals); (3) detection, surveillance, and alarm capabilities (e.g., intrusion alarms and door and vault locks); and (4) communications equipment. In addition, each of these control mechanisms have certain procedures that must be applied in order to achieve the safeguards objectives. In many cases the physical protection procedures are necessarily dictated by MC&A requirements and must involve MC&A personnel.

In assessing management effectiveness of the licensee's physical security system, the inspector should give special attention to places where PP interfaces and/or overlaps with MC&A. Observing for any safeguards gaps not covered by either PP or MC&A regulations is also necessarily an important aspect to an inspection.

Key issues which the inspector should keep in mind when auditing management effectiveness are summarized below. These key issues broadly address the above-mentioned performance objectives, and MC&A and PP

interfaces. The inspector is encouraged to develop these issues further as dictated by information collected during an inspection.

Key Issues in Physical Protection

1. Evaluate the quality of the licensee's use of physical barrier subsystems in contributing to the performance objectives in 10 CFR 73.45 (b)-(f).
 - a. Do they adequately delineate MAAs, VAs, and PAs and provide the intended defense?
 - b. What is the general awareness of the safeguards context of MAAs, VAs, and PAs (e.g., with respect to the handling, processing, and storage of SNM)?
 - c. What role does PP play when changes are proposed or made to the physical barrier subsystems?
 - d. Has the safeguards program experienced difficulties with the physical implementation of their MAAs, VAs, and PAs?
 - e. How has management responded to problem areas and/or to past attempts to compromise or circumvent the physical barrier subsystems?
2. Evaluate the quality of the licensee's access control subsystems and procedures in achieving the performance objectives of 10 CFR 73.45 (b)-(f).
 - a. What level of safeguards awareness, including SNM handling, does the PP staff possess?
 - b. Are locks and seals used effectively?
 - c. How effective are the guard portals operations during both light and heavy traffic periods?
 - d. How effective is the PP system during the transition between on and off shifts in facility operations?
 - e. How effective are PP personnel in applying control procedures?

- f. What problems have arisen in the licensee's use of PP access control subsystems and procedures?
 - g. What is management doing to ensure effective application of access control?
- 3. How effective is the licensee in applying PP surveillance and alarm measures?
 - a. SNM monitors?
 - b. Metal detectors?
 - c. Intrusion detectors?
 - d. Closed-circuit television?
- 4. Evaluate the quality of the licensee's PP security organization.
- 5. Evaluate the quality of communications between MC&A and PP with regard to
 - a. Current MC&A schedules and procedures for authorized personnel and materials within MAAs, VAs, and PAs.
 - b. Current MC&A schedules and procedures for authorized activities and conditions within MAAs, VAs, and PAs.
 - c. Current MC&A schedules and procedures for authorized placements and movements of SNM within MAAs.
 - d. Entry and exit criteria for MAAs, VAs, and PAs.
- 6. Evaluate the effectiveness of PP safeguards in interpreting and enforcing MC&A schedules and procedures regarding
 - a. Authorized personnel and materials within MAAs, VAs, and PAs.
 - b. Authorized activities and conditions within MAAs, VAs, and PAs.
 - c. Controls for authorized placement and movement of SNM within MAAs.
 - d. Entry and exit criteria for MAAs, VAs, and PAs.

7. Have there been any problems in PP safeguards fulfilling MC&A requirements and vice versa?
 - a. Do the same problems continue to occur over and over again?
 - b. How has management responded to these problems?
 - c. Are the problems technical in nature, centered around personalities, or other?
 - d. Do the problems appear to be irresolvable?
8. Evaluate the effectiveness of licensee safeguards during SNM shipments and transfers involving MAAs.
 - a. Is there adequate coordination and cooperation by PP and MC&A personnel in the use of SNM transfer tickets and authorizing signatures, and in confirmation and verification?
 - b. What operational problems have been experienced?
 - c. How has management contributed constructively?
 - d. Are there any apparent safeguards vulnerabilities in the transfer procedures?
9. Evaluate whether gaps exist between PP and MC&A safeguards coverage.
 - a. Are MC&A authorization schedules securely transmitted and received by PP?
 - b. Is there an adequate separation of control over locks and keys?
 - c. Does PP have the capability to prevent unauthorized removal of SNM from a PA (e.g., during a shipment of SNM between facility MAAs)?
 - d. Has management demonstrated initiative in monitoring for gaps?
 - e. How has management dealt with inadequate coverage due to gaps?
 - f. Have previous NRC inspections revealed potential and/or existing gaps?
 - g. How has management responded to NRC prodding?

10. How well does PP limit access by a single individual, including PP personnel, to multiple safeguards components:
- o SNM?
 - o SNM records?
 - o SNM measurement equipment?
 - o Measurement standards?
 - o Duplicate forms?
 - o Software?
 - o Locks and keys (used and unused)?
 - o Seals (used and unused)?
 - o Authorization lists?
 - o Other?
11. Are there known cases where the PP safeguards have been compromised or tested?
- a. What PP subsystems, procedures, etc., were involved?
 - b. How serious were the infractions?
 - c. Did the infractions involve falsification of records, tampering of equipment, or collusion of personnel?
 - d. Had management attempted to identify a priori the high risk areas and vulnerabilities of its PP system?
 - e. Were the vulnerabilities obvious?
 - f. How timely was the licensee in recognizing that an infraction had occurred? How effective was the response?
 - g. Did management have contingency plans and priorities established for reacting to a breach in the physical security?
 - h. What is management doing to prevent future problems?
12. Are facility operations activities in essence, but perhaps unintentionally, circumventing the intent of the PP subsystems?

- a. The PP security organization?
 - b. The PP physical barrier subsystems?
 - c. The PP access control subsystems and procedures?
 - d. The PP detection, surveillance, and alarm subsystems and procedures?
 - e. The PP communication subsystem?
 - f. The interactions between PP and MC&A?
 - g. What potential exists for interference between facility operations and PP?
13. How effective is the licensee in compensating for breaks in their PP safeguards (subsystems and procedures) due to emergencies, accidents, maintenance and repairs, etc?
- a. What breaks are known to exist?
 - b. Does the facility have a history of common-mode breakdowns in their subsystems?
 - c. What is management doing to ensure that effective coverage is always in place?
14. Are the licensee's PP subsystems and accompanying procedures satisfying both the letter and the spirit of the regulations?
15. How well does management plan in PP?
- a. Are problems anticipated and contingencies developed?
 - b. Does management operate in a reactionary mode?
16. What kind of track record does the licensee have in PP?
- a. Are there indications and trends that point to ineffective management?
 - b. What events have happened that suggest the absence of quality management?

4. INSPECTION CONCLUSIONS AND RECOMMENDATIONS

As stated previously, the objective of this inspection module is to independently assess the contributions of licensee management to overall safeguards systems performance. The inspector accomplishes this objective by comparing the licensee's safeguards management to both the 10 CFR, parts 70 and 73, requirements and to generally accepted management practices. The vehicle by which this comparison is to be made consists of assessment questions and key issues which point the inspector to areas of primary concern to the NRC and which raise additional issues for the purpose of exposing management ineffectiveness. Further insight into management effectiveness is obtained through those assessment questions specifically directed toward the licensee's safeguards system performance. If the quality of the safeguards is poor, then the inspector should strongly suspect that management's role is ineffective and should attempt to determine management's influence (or lack thereof) on the underlying safeguards deficiencies. (The converse is not necessarily true, however.) The assessment questions in essence provide an opportunity for the inspector to identify, to single out, and to probe further, questionable management practices.

Specific issues, circumstances, and concerns which point to questionable or inappropriate practices should be explicitly identified and referenced against the CFR and the assessment questions. The inspection report should also explain why the inspector feels certain management practices are poor, counter to the CFR, and/or point to ineffective management.

This inspection module has been designed so that an audit of safeguards management effectiveness for Policy, Organization, Feedback, and Task Assignments with the seven task-oriented safeguards groups can be accomplished separately and over an extended period of time. An inspector could therefore choose to combine an audit of management effectiveness, say, for example, measurement control, with an inspection for compliance. The format provided in Table 2 lends itself to this type of application. However, when the audit

for management effectiveness is completed, the inspector should provide overall conclusions which carefully correlate the conclusions reached for each major management function.

Concurrent with documenting the inspection results, the inspector should provide recommendations for alleviating observed management practices that are detrimental to effective safeguards. The recommendations could include:

- o Specific changes in the practices of the licensee,
- o Followup procedures on the part of NRC,
- o Proposed license changes.

Recommendations should be integrated into the final inspection report as indicated in Table 2.

Table 2

Format of Report for Inspector's
Audit of Management Effectiveness

- I. Conclusions and Recommendations with Respect to Policy
 - A. Conclusions
 - B. Recommendations
- II. Conclusions and Recommendations with Respect to Organization
 - A. Conclusions
 - B. Recommendations
- III. Conclusions and Recommendations with Respect to Feedback
 - A. Conclusions
 - B. Recommendations

Table 2, cont.

Format of Report for Inspector's
Audit of Management Effectiveness

IV. Conclusions and Recommendations with Respect to Material Accounting
Records

A. Conclusions

B. Recommendations

V. Conclusions and Recommendations with Respect to Physical Inventory

A. Conclusions

B. Recommendations

VI. Conclusions and Recommendations with Respect to Material Control

A. Conclusions

B. Recommendations

Table 2, cont.

Format of Report for Inspector's
Audit of Management Effectiveness

VII. Conclusions and Recommendations with Respect to Measurement Control

A. Conclusions

B. Recommendations

VIII. Conclusions and Recommendations with Respect to Statistical Evaluations

A. Conclusions

B. Recommendations

IX. Conclusions and Recommendations with Respect to ID/LEID Evaluations

A. Conclusions

B. Recommendations

Table 2, cont.

Format of Report for Inspector's
Audit of Management Effectiveness

X. Conclusions and Recommendations with Respect to Physical Protection
A. Conclusions

B. Recommendations

XI. Overall Conclusions and Recommendations for Management Effectiveness
A. Conclusions

B. Recommendations